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XX. *Account of the Free Martin.*

By Mr. John Hunter, F. R. S.

Read February 25, 1779.

GENERATION, when produced from a seed, has two causes which concur towards its perfection; the one which forms the seed, the other which gives it the principle of action ^(a).

The cause which forms the seed is called the female, the other cause is called the male; but those two causes in general make only a part of a whole animal, or are

(a) It may be necessary for some of my readers to have explained to them what I mean by a seed. I do suppose, that the word seed was first applied to grain, or that which is always called seed in the vegetable; which seed is the part of that class of vegetables in which the matter of the young vegetable exists, or is formed. The principle of arrangement fitting the parts for action in this class of seed being at first not known, a false analogy between the vegetable and animal was established, viz. the secretion of the *testes* (the only known principle in the animal) was called the seed: but from the knowledge of the distinct sexes in the vegetable it is well known, that the seed is the female production in them, and that the principle of arrangement for action is from the male. The same operation and principles take place in many orders of animals, viz. the female produces a seed, in which is the matter fitted for the first arrangement of the organs of the animal, and which receives the principle of arrangement fitting them for action from the male.

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rather parts superadded to an animal. Probably they were first considered in those animals where those parts were separated, or in which the female parts were wholly found in one animal and the male in the other; therefore the terms female and male have been applied to the whole animal, dividing them into two distinct sexes, and the parts which formed either the one sex or the other called either the female or the male parts of generation; but upon a further knowledge of animals, and of those parts, they were found to be united in the same animal in many of the inferior tribes, who, from possessing both parts, have got the name of hermaphrodite.

As both those parts are natural to most animals, and as the union of them in the same animal is also natural to many, and the separation of them in distinct animals, is only a circumstance making no essential difference in the parts themselves; it becomes no great effort or uncommon play in nature to unite them in those animals in which they are commonly separated.

And accordingly we find many of those orders of animals, which have them separate naturally, have them sometimes united.

From this account hermaphrodites may be divided into two kinds; the natural, and the unnatural uncommon or monstrous.

The natural belongs to the inferior and more simple order of animals, of which there are a much greater number than of the more perfect; but as animals become more complicated, have more parts, and each part is more confined to its particular use, a separation of the two necessary powers for generation have also taken place in them.

The unnatural, I believe, now and then takes place in every tribe of animals having distinct sexes, but is more common in some than in others ^(b). I fancy the human has the fewest, never having seen them in that species nor in dogs: cats we know less of; but in the horse, ass, sheep, and cattle, they are very frequent.

Though this species of hermaphrodite be a mixture of both sexes, and so possesses the parts peculiar to each in perfection, there is yet one part of each which it does not possess: I mean the part which is common to both. For as this common part is different in one sex from what it is in the other, and it is impossible for one animal to have both kinds; that which they do have must of course partake of both sexes, and consequently render the hermaphrodite imperfect *quoad hoc*.

(b) *Quere*, Is there ever in the tribe of animals, that are natural hermaphrodites, a separation of the two parts?

This one or common part is the *clitoris* in the female; and *penis* in the male; and the great difference in this part between the one sex and the other is size and perforation for the *semen*.

But those parts, which are peculiar to each sex, may be all perfectly joined in the same animal, which would come up to the idea of the truest hermaphrodite.

The hermaphrodites of this kind, which I have seen, have always appeared externally, and, at first view, to be females: and in those species of animals where only the female is preserved for breeding, as in sheep, goats, pigs, &c. they are generally saved as females..

In the horse they are very frequent: I have seen several, but never dissected any. The most perfect I have seen in this species were those in which the testicles had come down out of the *abdomen* into the place where the udder should have been (*viz.* more forward than the *scrotum*) and appeared like an udder, not so pendulous as what the *scrotum* is in the true male of such animals. There were also two nipples, which horses have no perfect form of, being blended in them with the sheath or *prepuce*, of which there was none here.

The external female parts were exactly similar to those of the perfect female; and, instead of a common-
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sized *clitoris*, there was one about five or six inches long, which, when erect, stood almost directly backwards.

I procured a foal ass, very similar in external appearance to the above horse, and killed it, to examine the parts. It had two nipples, but the testicles were not come down as in the above; owing, perhaps, to the animal's being yet too young.

There was no *penis* passing round the *pubis* to the belly as in the perfect male ass.

The external female parts were similar to those of the she-ass. Within the entrance of the *vagina* was placed the *clitoris*, but much longer than that of a true female, being about five inches long. The *vagina* was open a little further than the opening of the *urethra* into it, and then became obliterated; from thence up to the *fundus* of the *uterus* there was no canal.

At the *fundus* of the common *uterus* it was hollow, or had a cavity in it, and then divided into two, *viz.* a right and a left, called the horns of the *uterus*, which were also pervious.

Beyond the termination of the two horns were placed the *ovaria* as in the true female, but I could not find the *fallopian* tubes.

From the broad ligaments to the edges of which the horns of the *uterus* and the *ovaria* were attached, there

passed towards each groin a part similar to the round ligaments in the female, which were continued into the rings of the *abdominal* muscles; but with this difference, that there were continued with them a *process* or *theca* of the *peritoneum*, similar to the *tunica vaginalis communis* in the male ass, and in these *thecæ* were found the testicles: but I could not observe any *vasa deferentia* passing from them.

Here then we found in the same animal the parts peculiar to each sex (although very imperfect), and that part which is common to both (but different in each) was a kind of medium of that difference.

Something similar to the above I have seen in sheep, goats, &c.; but I shall not at present trouble the Society with a description of hermaphrodites in general, as it is a very extensive subject, admitting of great variety, which would make it appear a production of chance, whereas the intention of this paper is to show a circumstance which takes place in the production of hermaphrodites in cattle, and which appearing to be an established principle in the oeconomy of propagation of that species of animal, and not a production of chance, is, perhaps, peculiar to them, and, probably, the only way in which they are ever produced in this species.

It is a known fact, and, I believe, is understood to be universal, that when a cow brings forth two calves, and that one of them is a bull-calf, and the other a cow to appearance, the cow-calf is unfit for propagation; but the bull-calf becomes a very proper bull. They are known not to breed: they do not even shew the least inclination for the bull, nor does the bull ever take the least notice of them ^(c).

This cow-calf is called in this country a *free martin*; and this singularity is just as well known among the farmers as either cow or bull.

This calf has all the external marks of a cow-calf similar to what was mentioned in the unnatural hermaphrodite, *viz.* the teats and the external female parts, called by farmers the bearing.

When they are preserved it is not for propagation, but for all the purposes of an ox or spayed heifer, *viz.* to yoke with the oxen, and to fatten for the table ^(d).

They resemble in form those imperfect animals very much, *viz.* they are much larger than either the bull or the cow, and the horns grow larger, being very similar to the horns of an ox.

(c) I need hardly observe here, that if a cow has twins, and that they are both bull-calves, that they are in every respect perfect bulls; or if they are both cow-calves, that they are perfect cows.

(d) *Vide* LESLIE on Husbandry, p. 98, 99.

The bellow of the free martin is fimilar to that of an ox, which is not at all like that of a bull; it is more of the cow, although not exactly that.

The meat is alfo fimilar to that of the ox or fpayed heifer, *viz.* much finer in the fibre than either the bull or cow; and they are more fufceptible of growing fat with good food. By fome they are fupposed to exceed the ox and heifer in delicacy of food, and bear a higher price at market.

However, it feems that this is not univerfal; for I was lately informed by CHARLES PALMER, efq. of Luckley in Berkfhire, that there was a free martin killed in his neighbourhood, and, from the general idea of its being better meat than common, every neighbour befpoke a piece, which turned out nearly as bad as bull beef, at leaft worfe than that of a cow. It is probable, that this might arife from this one having more the properties of the bull than the cow, as we fhall fee hereafter that they are fometimes more the one than the other ^(e).

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(e) The Romans called the bull *taurus*: they, however, talked of *tauræ* in the feminine gender. And STEPHENS obferves, that it was thought the Romans meant by *tauræ*, barren cows, and called them by this name becaufe they did not conceive any more than bulls. He alfo quotes a paffage from COLUMELLA, lib. vi. cap. 22. “and like the *tauræ*, which occupy the place of
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Free martins are said to be in sheep^(f); but from the accounts given of them, I should very much suspect that these are hermaphrodites produced in the common way, and not like those of cattle. They are often imperfect males, several of which I have seen. They are mentioned as both male and female, which is not reconcilable to the account given of the free martin.

I believe it has never been even supposed what this animal is, with all those peculiarities.

From the singularity of the animal, and the account of its production, I was almost ready to suppose the account a vulgar error; yet from the universality of its testimony it appeared to have some foundation; and therefore I made all the inquiry I could for an opportunity of seeing one, and also to examine it. Since which time I have accordingly had an opportunity of seeing three; the first of which was one belonging to JOHN ARBUTHNOT, esq. of Mitcham, which was calved in his own farm. He was so obliging as to give me an opportunity of satisfying myself. He allowed me, first, to have a drawing made of the animal while alive, which was exe-

“fertile cows, should be rejected, or sent away.” He likewise quotes VARRO, *De re Rustica*, lib. ii. cap. 5. “The cow which is barren, is called *taura*.” From which we may reasonably conjecture, that the Romans had not the idea of the circumstances of their production.

(f) LESLIE'S Husbandry, p. 156.

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cuted by Mr. GILPIN. When the drawing was made of Mr. ARBUTHNOT's free martin, JOHN WELLS, esq. of Bickley Farm, near Bromley in Kent, was present, and informed us, that a cow of his had calved two calves; and that one was a bull-calf, and the other a cow-calf. I desired Mr. ARBUTHNOT to speak to Mr. WELLS to keep them, or let me buy them of him; but, from his great desire for natural knowledge, he very readily preserved both, till the bull shewed all the signs of a good bull, when he sold him.

From the dissection of the three above mentioned free martins it plainly appeared, that they were all hermaphrodites differing from one another; as is also the case in hermaphrodites in other tribes.

*The Description of the three Free Martins.**Mr. ARBUTHNOT'S Free Martin* ^(g).

The external parts were rather smaller than in the cow. The *vagina* passed on, as in the cow, to the opening of the *urethra*, and then it began to contract into a small canal, which passed on to the division of the *uterus* into the two horns, each horn passed along the edge of the broad ligament laterally towards the *ovaria*.

At the termination of those horns were placed both the *ovaria* and the testicles; both were nearly of the same size, which was about as large as a small nutmeg.

To the *ovaria* I could not find any *Fallopian* tube.

To the testicles were *vasa deferentia*, but they were imperfect. The left one did not come near the testicle; the right only came close to it, but did not terminate in a body called the *epididymis*. They were both pervious, and opened into the *vagina* near the opening of the *urethra*.

(g) This animal was about seven years old, had been often yoked with the oxen; at other times went with the cows and bull, but never shewed any desires for either the one or the other.

On the posterior surface of the bladder, or between the *uterus* and bladder, were the two bags, called *vesiculæ feminales* in the male, but much smaller than what they are in the bull: the ducts opened along with the *vasa deferentia*. This was more deserving the name of hermaphrodite than the two following; for it had a mixture of all the parts, although all were imperfect.

Mr. WRIGHT'S Free Martin, five years old.

The *vagina* terminated in a blind end, a little way beyond the opening of the *urethra*, beyond which the *vagina* and *uterus* were impervious. The *uterus* at its extreme part divided into two horns. At the termination of the horns were placed the testicles instead of the *ovaria*, as is the case in the female. The reasons why I call those bodies testicles are the following. First, they were more than twenty times larger than the *ovaria* of the cow, and nearly as large as the testicles of the bull, particularly as those of the ridgill, the bull whose testicles never come down. Secondly the spermatic arteries were exactly similar to those of the bull, especially of the ridgill. Thirdly, the *cremaster* muscle passed up from the

the rings of the abdominal muscles to the testicles, as it does in the ridgill ^(b).

There were the two bags placed behind the bladder, between it and the *uterus*. Their ducts opened into the *vagina*, a very little way beyond the opening of the *urethra*; but there was nothing similar to the *vasa deferentia*.

As the external parts had more of the cow than the bull, the *clitoris*, which may also be reckoned an external part, was also similar to that of the cow; not at all in a middle state between the *penis* of the bull and the *clitoris* of the cow, as I have described in the hermaphrodite horse. There were four teats; the glandular part of the udder was but small.

This animal cannot be said to have been a mixture of all the parts of both sexes, for the *clitoris* had nothing similar to the *penis* in the male, and was different in the cow part, in having nothing similar to the *ovaria*, nor was the *uterus* a cavity.

(b) Although I call these bodies testicles for the reason given, yet they were only imitations of such, for when cut into they had nothing of the structure of the testicle: not being similar to any thing in nature, they had more the appearance of disease. From the seeming imperfection of the animal itself, it was not to be supposed that they should be testicles, for then the animal should have partook of the bull, which it certainly did not.

Mr. WELLS's Free Martin.

This animal was never seen to shew any signs of a desire for the male, although it went constantly with one. It looked more like an heifer than what they commonly do; but as it was only between three and four years old when killed, it is very probable, that it was not sufficiently old to have taken the characters of the ox; however, this may be owing to another circumstance that will be mentioned hereafter.

The teats and udder were small compared with those of a heifer, but rather larger than in either of the former; the beginning of the *vagina* similar to that of the cow, but it soon became obliterated beyond the opening of the *urethra*, as in the last described. The *vagina* and *uterus* to external appearance was continued, although not pervious, and the uterine part divided into two horns, at the end of which were the *ovaria*.

I could not observe in this any other body which I might have supposed to be the testicle.

There was on the side of the *uterus* an interrupted *vas deferens* broken off in several places.

Behind the bladder, or between it and the *vagina*, were the bags called *vesiculæ seminales*, between which were the terminations of the two *vasa deferentia*.

The ducts of the bags and the *vasa deferentia* opened as in the former.

This could not be called an exact mixture of all the parts of both sexes, for here was no appearance of testicles.

The female parts were imperfect, and there was the addition of part of the *vasa deferentia*, and the bags called *vesiculæ seminales*.

This circumstance of having no testicles, perhaps, was the reason why it had more the external appearance of a heifer than what they commonly have, and more than either of the two former had.

